SLOVENSKI STANDARD
SIST EN 14408-3:2005

01-januar-2005

Cevni sistemi iz polimernih materialov za obnovo podzemnih omrežij za oskrbo s plinom - 3. del: Oblaganje s tesno prilagodljivimi cevmi

Plastics piping systems for renovation of underground gas supply networks - Part 3: Lining with close-fit pipes

Kunststoff-Rohrleitungssysteme für die Renovierung von erdverlegten Gasversorgungsnetzen - Teil 3: Close-Fit-Lining

Systemes de canalisations plastiques pour la rénovation des réseaux de gaz enterrés - Partie 3 : Tubage par tuyau continu sans espace annulaire

Ta slovenski standard je istoveten z: **EN 14408-3:2004**

ICS:

83.140.30	Cevi, fitingi in ventili iz polimernih materialov	Plastics pipes, fittings and valves
91.140.40	Sistemi za oskrbo s plinom	Gas supply systems

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Plastics piping systems for renovation of underground gas supply networks - Part 3: Lining with close-fit pipes

Systèmes de canalisations plastiques pour la rénovation des réseaux de gaz enterrés - Partie 3 : Tubage par tuyau continu sans espace annulaire

Kunststoff-Rohrleitungssysteme für die Renovierung von erdverlegten Gasversorgungsnetzen - Teil 3: Close-Fit-Lining

This European Standard was approved by CEN on 29 July 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Contents

Foreword

This document (EN 14408-3:2004) has been prepared by Technical Committee CEN/TC 155, "Plastics piping systems and ducting systems", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

System standards dealing with the following applications are either available or in preparation:

— Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks;

— **Plastics piping systems for renovation of underground gas supply networks [this application];**

— Plastics piping systems for renovation of underground water supply networks;

— Plastics Piping Systems for Renovation of underground pressure drainage and sewerage networks;

— Plastics piping systems for renovation of industrial pipe systems.

These system standards are distinguished from system standards for conventionally installed plastics piping systems by the requirement to verify certain characteristics in the as-installed condition, after site processing. This is in addition to verification of characteristics of plastics piping systems as manufactured.

These system standards are complemented by the information contained in ISO/TR 11295 [5] and EN 13689 [2] (listed in the bibliography).

The system standard EN 14408 comprises four parts, as follows:

— Part 1: General

— Part 2[1)]: Lining with continuous pipes

— Part 3: Lining with close-fit pipes (this document)

— Part 4[1)]: Lining with cured-in-place pipes

The requirements for any given renovation technique family are covered by *Part 1: General*, and are for use in conjunction with the relevant other part. For example, for the requirements relating to "Lining with close-fit pipes", it is necessary to refer to both parts 1 and 3.

A consistent structure of clause headings has been adopted for all parts to facilitate direct comparisons across renovation technique families.

Figure 1 shows the common part and clause structure and the relationship between EN 14408 and the system standards for other applications.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[1)] At the date of publication of this document, the standardization work on prEN 14408-2 and prEN 14408-4 has not started.

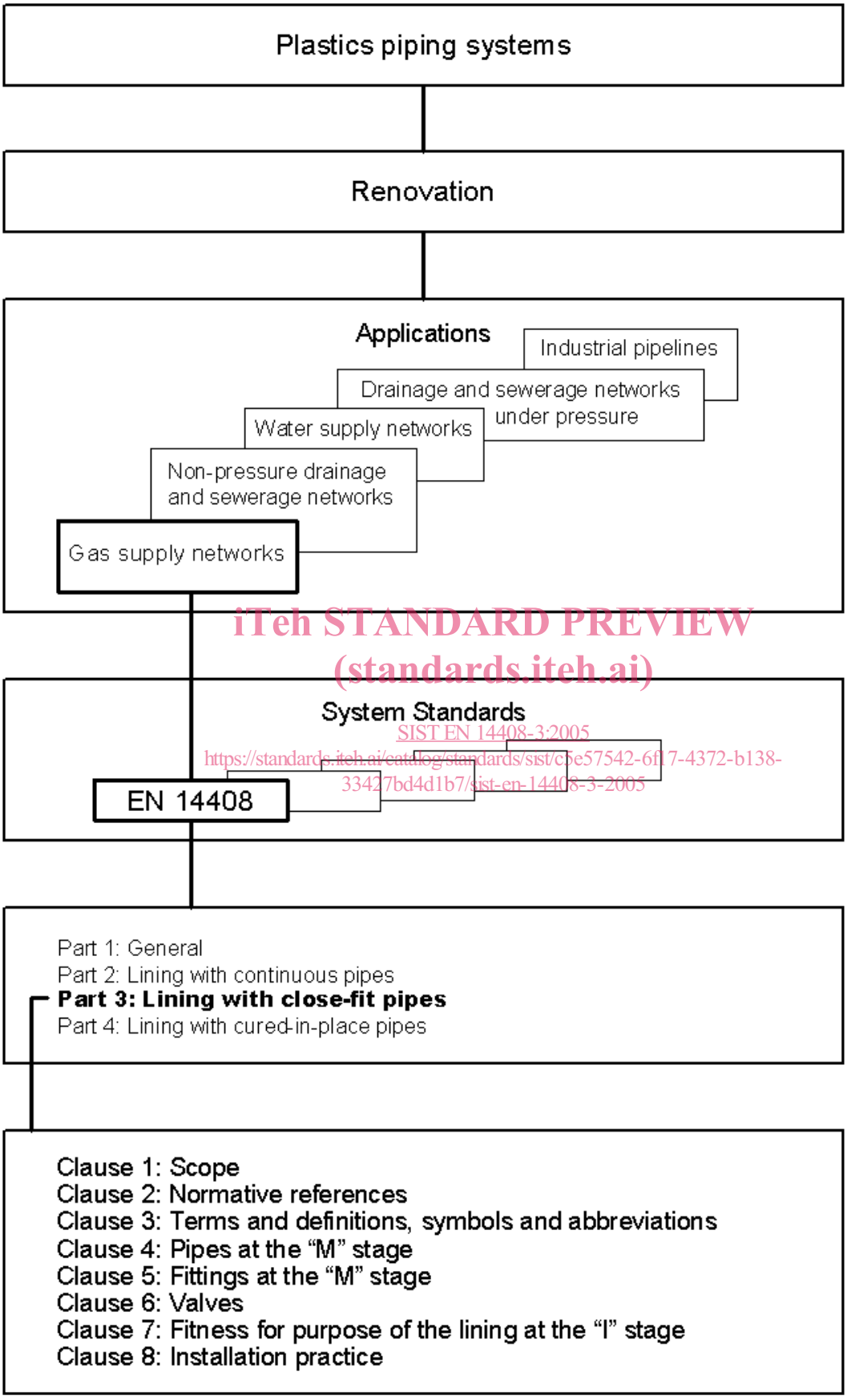

Figure 1 — Format of the renovation system standards

1 Scope

This part 3 of EN 14408, in conjunction with EN 14408-1:2004 specifies requirements and test methods for close-fit lining systems intended to be used for the renovation of gas supply networks.

It covers polyethylene (PE) pipe for both independent and interactive pressure pipe liners and associated fittings and joints for the construction of the lining system. It is applicable to the plastic lining system intended to be used under the following conditions:

a) a maximum operating pressure, MOP, up to and including 10 bar [1)];

b) an operating temperature of 20 °C as reference temperature.

NOTE For other operating temperatures, de-rating coefficients may be used, see EN 1555-5.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1555-1:2002, *Plastics piping systems for gaseous fuel supply — Polyethylene (PE) — Part 1: General*

EN 1555-2:2002, *Plastics piping systems for gaseous fuel supply — Polyethylene (PE) — Part 2: Pipes*

EN 1555-3:2002, *Plastics piping systems for gaseous fuel supply — Polyethylene (PE) — Part 3: Fittings*

EN 1555-4, *Plastics piping systems for gaseous fuel supply — Polyethylene (PE) — Part 4: Valves*

EN 1555-5, *Plastics piping systems for gaseous fuel supply — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

EN 14408-1:2004, *Plastics systems for renovation of underground gas supply networks — Part 1: General*

EN ISO 899-1:2003, *Plastics — Determination of creep behaviour — Part 1: Tensile creep (ISO 899-1:2003)*

prEN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO FDIS 3126:2002)*

ISO 12176-1, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 1: Butt fusion*

ISO 12176-2, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 2: Electro fusion*

1) 1 bar = 0,1 MPa

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the terms, definitions, symbols and abbreviations given in EN 14408-1:2004 and the following apply.

3.1 General terms and definitions

3.1.1
close fit
situation of the outside of the installed liner relative to the inside of the existing pipeline, which may either be an interference fit or include a small annular gap resulting from shrinkage and tolerances only

3.1.2
close-fit pipe
continuous lining pipe of thermoplastic material reshaped or otherwise expanded after insertion to achieve a close fit to the existing pipeline

3.2 Terms and definitions related to techniques

No definitions apply.

3.3 Geometrical definitions

3.3.1
outside diameter (at any point)
d_e
value of the measurement of the outside diameter through its cross-section at any point of the pipe, rounded to the next greater 0,1 mm

3.3.2
minimum mean outside diameter
$d_{em,min}$
minimum value for the mean outside diameter as specified for a given nominal size

3.3.3
maximum mean outside diameter
$d_{em,max}$
maximum value for the mean outside diameter as specified for a given nominal size

3.3.4
out-of-roundness (ovality)
difference between the maximum and the minimum outside diameter in the same cross-section of a pipe or spigot

3.3.5
nominal wall thickness
e_n
numerical designation of the wall thickness of a component, which is a convenient round number, approximately equal to the manufacturing dimension in millimetres (mm)

NOTE For thermoplastics components conforming to EN 1555, the value of the nominal wall thickness, e_n, is identical to the specified minimum wall thickness at any point, e_{min}.

3.3.6
minimum wall thickness (at any point)
e_{min}
minimum value for the wall thickness around the circumference of a component, as specified

3.3.7
maximum wall thickness (at any point)

$e_{m,max}$
maximum value for the mean wall thicknessaround the circumference of a component, as specified

3.3.8
tolerance
permitted variation of the specified value of a quantity, expressed as the difference between the permitted maximum and the permitted minimum value

3.4 Material definitions

3.4.1
compound
homogenous mixture of base polymer (PE) and additives, i.e. anti-oxidants, pigments, UV-stabilisers and others, at a dosage level necessary for the processing and use of components conforming to the requirements of this document

3.5 Definitions related to material characteristics

3.5.1
lower confidence limit of the predicted hydrostatic strength

σ_{LPL}
quantity, expressed in megapascals (MPa), which can be considered as a material property, representing the 97,5 % lower confidence limit of the predicted long-term hydrostatic strength for water at 20 °C for 50 years

3.5.2
minimum required strength (MRS)
value of LPL, rounded to the next lower value of the R10-series when the LPL is below 10 MPa, or to the next lower value of the R20-series when the LPL is 10 MPa or greater

NOTE R10- and R20-series are the Renard number series conforming to ISO 3[3] and ISO 497[4].

3.5.3
overall service (design) coefficient or safety factor
C
coefficient with a value greater than one, which takes into consideration service conditions as well as properties of the components of a piping system other than those represented in the LPL

NOTE The minimum overall design coefficient for gas is 2,0.

3.5.4
design stress
σ_S
allowable stress, in megapascals, for a given application. It is derived from the MRS by dividing it by the coefficient C, i.e.:

$$\sigma_S = \left[\frac{[MRS]}{C}\right]$$

3.5.5
melt-mass flow rate (MFR)
value relating to the viscosity of the molten material at a specified temperature and rate of shear, expressed in grams per 10 min (g/10 min)

3.6 Definitions related to service conditions

3.6.1
gaseous fuel
any fuel which is in gaseous state at a temperature of 15 °C, at the atmospheric pressure

3.6.2
maximum operating pressure (MOP)
maximum effective pressure of the fluid in the piping system, expressed in bar, which is allowed in continuous use. It takes into account the physical and the mechanical characteristics of the components of a piping system

NOTE It is calculated using the following equation:

$$[\mathrm{MOP}] = \frac{20 \times [\mathrm{MRS}]}{C \times ([\mathrm{SDR}] - 1)}$$

3.7 Definitions related to joints

3.7.1
electrofusion joint
joint between a PE electrofusion socket or saddle fitting and a pipe or a spigot end fitting. The electrofusion fittings are heated by the Joule effect of the heating element incorporated at their jointing surfaces, causing the material adjacent to them to melt and the pipe and fitting surfaces to fuse

3.7.2
butt fusion joint (using heated tool)
joint made by heating the planed ends the surfaces of which match by holding them against a flat heating plate until the PE material reaches fusion temperature, removing the heating plate quickly and pushing the two softened ends against one another

3.7.3
mechanical joint
joint made by assembling a PE pipe with a fitting that generally includes a compression part to provide for pressure integrity, leaktightness and resistance to end loads.

3.7.4
fusion compatibility
ability of two similar or dissimilar polyethylene materials to be fused together to form a joint which conforms to the performance requirements of this document

3.8 Definitions related to assessment of conformity

No definitions apply

3.9 Symbols and abbreviations

3.9.1 Symbols

C : overall service (design) coefficient

d_e : outside diameter (at any point)

d_{em} : mean outside diameter

$d_{em,max}$: maximum mean outside diameter

$d_{em,min}$: minimum mean outside diameter

d_{manuf} : the original circular diameter of the pipe (before folding)

$e_{m,max}$: maximum mean wall thickness

T : temperature at which stress rupture data have been determined

t : time for leak to occur in the test piece

t_y : wall thickness tolerance

σ_s : design stress

3.10 Abbreviations

DN : nominal size

DN/OD : nominal size, outside diameter related

LPL : lower confidence limit of the predicted hydrostatic strength

MFR : melt mass-flow rate

MOP : maximum operating pressure

MRS : minimum required strength

PE : polyethylene

R : series of preferred numbers, conforming to the Renard series

4 Pipes at the “M” stage

4.1 Materials

4.1.1 Virgin material

The compound shall conform to EN 1555-1:2002.

4.1.2 Reprocessable material and recyclable material

Own reprocessable material may be used, provided that it is derived from the same compound, as used for the relevant production.

External reprocessable material shall not be used.

Recyclable material shall not be used.

4.2 General characteristics

4.2.1 Appearance

When viewed without magnification, the internal and external surfaces of the pipe shall be smooth, clean and free from scoring, cavities and other defects which would prevent conformity to this document.

4.2.2 Colour

The pipes shall be yellow or orange, black or black with yellow identification stripes

4.3 Material characteristics

The material from which the pipes are made shall conform to the requirements as specified in Table 1 of EN 1555-1:2002.

4.4 Geometric characteristics

The pipe diameter, wall thickness and shape in the "M" stage depend on the specific close-fit lining technique. "M" stage dimensions needed to obtain "I" stage dimensions (see 7.4), shall be declared, with their tolerances, by the manufacturer.